## REMARKS

The Examiner rejected claims 1-27 as obvious (35 U.S.C. §103) over Tanaka (U.S. Patent No. 5,542,064) in view of Arnon (U.S. Patent No. 6,493,796 B1).

Amended independent claims 1, 10, and 19 concern accessing a data set from one of two storage devices, each including a copy of the data set. These claims require: maintaining a flag for each storage device indicating whether a previous access attempt of the data set from the storage device failed; maintaining a data level for each of the plurality of data sets in each storage device indicating a number of times the data set has been updated, wherein there is a separate data level for each copy of one data set in different storage devices; receiving a request to one data set; selecting the storage device having a higher data level if the data levels are not equal; selecting the storage device having the flag indicating that no previous access attempt failed if the flag for the other storage device indicates that one previous access attempt of the data set from the storage device failed and if the data levels are equal; and accessing the data set from the selected storage device.

Applicants amended claims 1, 10, and 19 to emphasize that there is a separate data level for each copy of one data set in different storage devices and the data levels for different storage devices having copies of one data set are capable of being equal.

In the Response to Arguments of the Office Action, the Examiner continues to find that col. 5, lines 8-11, 13, and 58-63 and FIG. 3 teach the claim requirement that there be a data level for each data set in each storage device indicating a number of times the data has been updated. each storage device. (Office Action, pgs. 3 and 7). Applicants traverse.

The cited col. 5 and FIG. 3 discuss information maintained for logical addresses 105-1, 105-2 in storage. History and multiplicity information 120-1, 120-2, 120-3 is maintained for each different logical address 105-1. The multiplicity information indicates the number of disk drives in which duplicate data for a history number of a logical address is maintained. The history number indicates a history number of the data, where multiple history numbers for a logical address indicates multiple sets of history data. Each history number of the data for a logical address may have multiple disk drives (the multiplicity). However, although multiple

Page 10 of 19

histories are maintained, only the copy of the data set having the lowest history number is accessed. For instance, for a read, data for a logical address is accessed from disk drives associated with the lowest history number. (Col. 8, lines 1-20) For writing, disk drives for the logical address associated with the lowest history number are accessed. (Col. 9, lines 5-20).

Thus, the cited history number of Tanaka does not indicate a number of times a data set has been updated, but instead indicates a history version or number of data for a logical address. As shown in FIG. 3, each history number of the data may be stored on multiple drives, indicated by the multiplicity number.

Further, the cited Tanaka mentions that the history number indicates "the order for updating of data" (col. 5, lines 8-12) Thus, the cited history number of Tanaka does not teach or suggest a data level for each storage device indicating the number of times the data set was updated. Instead, the history information indicates a separate history data of a logical address, which indicates the order of updating the data, not the number of times a copy of the data set has been updated as claimed.

Further, the claims require selecting the storage device having a higher data level if the data levels are not equal and that the data levels for storage devices having copies of one data set are capable of being equal. Applicants submit that Tanaka teaches away from this claim requirement because Tanaka teaches that the history numbers for a logical address are different and nowhere suggests or indicates that the history numbers for a logical address can be equal. In the claims, the data levels can be different because the data levels for copies of a data set indicate the number of times the copy of a data set has been updated. Applicants submit that Tanaka, by showing different history numbers, teaches away from the claimed data level indicating a number of times a data set is updated, which may allow for data levels for copies of a data set being equal, i.e., updated the same number of times.

The Examiner cited col. 7, lines 4-17 as teaching the claim requirement of selecting the storage device having a higher data level if the data levels are not equal. (Office Action, pg. 3) Applicants traverse.

The cited col. 7 mentions that when a failure occurs a flag indicating that the disk drive cannot be used may be set. Nowhere does this cited col. 7 anywhere teach or suggest selecting a storage device having a higher data level (indicating the number of times the data level copy has been updated) of the copy of the data set if the data levels are not equal. Instead, the cited col. 7 mentions a flag indicating that a disk drive failed and cannot be used, not selecting a storage device having a higher data level, i.e., selecting the data set copy in the storage device that was updated a greater number of times. Thus, this requirement is also not taught or suggested in the cited art.

Applicants submit that the claim requirement of selecting the storage device having the flag indicating that no previous access attempt failed if the flag for the other storage device indicates that one previous access attempt of the data set from the storage device failed and if the data levels are equal is not taught in the cited art. Tanaka teaches away from this claim requirement because the cited history numbers of Tanaka for a logical address, which the Examiner likens to the claimed data level, are not equal, i.e., each history number for a logical address is different. Thus, Tanaka nowhere teaches or suggests the claim requirements concerning how to proceed if the data levels for a data set are equal because Tanaka teaches away from having history numbers that are equal.

The Examiner also cited the above discussed col. 7, lines 4-17 as teaching the claim requirement for selecting storage devices when the data elves are equal. (Office Action, pg. 3). Applicants traverse. The cited col. 7 just mentions setting a flag indicating that a disk drive cannot be used. Nowhere does the cited col. 7 anywhere teach or suggest how to select one of multiple storage devices having copies of the data set if the data levels for the storage devices are equal. Instead, the cited col. 7 discusses how to indicate a disk drive as failed.

Applicants further submit that the cited Arnon does not overcome any of the above discussed deficiencies of Tanaka. The Examiner cited col. 14, lines 19-26 of Arnon with respect to the claim requirement that two storage devices include a copy of the same data set and that a flag is maintained for each storage device. (Office Action, pgs. 3, 7) The cited Arnon mentions flags for each storage device indicating the state of the device as on-line, off-line, or pending off-

Page 12 of 19

line. Nowhere does the cited Arnon teach or suggest that in response to receiving an access request, flags of storage devices having the same data set are considered and the storage device having a flag indicating no previous access failure is selected when the other storage device flag indicates a previous access failure. Further, nowhere does this cited Arnon anywhere teach, suggest or mention the claim requirement of selecting storage device having the flag indicating no previous access if the data levels are equal, where the data levels for storage devices having copies of one data set indicate a number of times the data set in the storage devices was accessed and are capable of being equal.

The Examiner also referenced the table discussed in Arnon accessible to the storage system. (Office Action, pg. 3) The cited Arnon mentions that a table may be stored in other locations accessible to the storage system. However, nowhere does the cited Arnon mention that the storage devices for which flags are maintained include the same data set that may be accessed, or teach or suggest data levels for different storage devices having copies of one data set used to select one of the storage devices to access the data set.

Thus, although both Tanaka and Arnon mention flags with storage devices indicating a state of the storage device, such as failed, nowhere does the cited Tanaka nor Arnon teach or suggest, alone or in combination, maintaining data levels for storage devices having copies of one data set and using the flag and data level indicating a number of times the data set copy in one storage device has been updated when selecting one storage device to use for the access. For instance, nowhere do these cited references anywhere teach, suggest or mention the added requirement of selecting the storage device having the flag indicating that no previous access attempt failed if the flag for the other storage device indicates that one previous access attempt of the data set from the storage device failed and if the data levels are equal. Yet further, nowhere do these cited references teach the claim requirement that the storage device having a flag indicating no previous access failure is selected when the other storage device flag indicates a previous access failure. Thus, even if the references may be combined, they still do not teach or suggest all the claim requirements.

Page 13 of 19

Accordingly, claims 1, 10, and 19 are patentable over the cited art because the cited art, alone and in combination, does not teach or suggest all the claim requirements.

Claims 2-9, 11-18, and 20-27 are patentable over the cited combination of art because they depend from claims 1, 10, and 19, which are patentable over the cited art for the reasons discussed above, and because they add requirements that in combination with the base and intervening claims from which they depend, further distinguish over the cited combination. Moreover, claims 2, 4-9, 11, 13-18, 20, and 22-27 provide additional grounds of patentability over the cited art.

Claims 2, 11, and 20 depend from claims 1, 10, and 19, respectively, and further require using a selection criteria to access one of the first and second storage devices that is unrelated to a value of the flag if the flags for both storage devices have the same value. In the Final Office Action, the Examiner cited col. 9, lines 47-48 of Tanaka as teaching the additional requirement of these claims. (Office Action, pg. 5). Applicants traverse.

The cited col. 9 mentions that if the number of selected disk drives cannot satisfy the multiplicity, then supplements are selected from disk drives having data satisfying the conditions. Tanaka mentions that the multiplicity is the number of instances of identical data, where the number of disk drives should be larger than the multiplicity. (Tanaka, col. 5, line 38 to col. 6, line 5)

In the previous response, Applicants explained that nowhere does the cited col. 9 anywhere teach or suggest a selection criteria to access a copy of a data set from one of two storage devices that is unrelated to the flag for each device indicating whether a previous access attempt to the device failed. Further, the cited col. 9 does not teach the claim requirement of selecting a device in response to an access request for a data set having copies on two different storage device. Instead, the cited col. 9 concerns ensuring there are enough disk drives or other areas to write multiple instances of identical data. Nowhere does the cited col. 9 anywhere teach selecting one of two storage devices for an access based on the flag value and another selection criteria unrelated to the flag.

Page 14 of 19

In the Office Action, the Examiner did not respond to the above arguments with respect to claims 2, 11, and 20, nor explain where the cited Tanaka teaches or suggests the claim requirement of selecting one of two storage devices for an access based on the flag value and another selection criteria unrelated to the flag.

Accordingly, claims 2, 11, and 20 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Amended claims 4, 13, and 22 depend from claims 1, 10, and 19 and further require that a flag and data level are maintained for each data set in the first and second storage devices and wherein the first and second storage devices have the same data sets.

In the Office Action, the Examiner cited col. 2, lines 26-29 of Tanaka as teaching the additional requirements of these claims. (Office Action, pg. 5). Applicants traverse.

The cited col. 2 mentions writing identical data to enhance I/O throughput of a secondary storage device having a plurality of storage units. In the previous response, Applicants explained that nowhere does this cited col. 2 anywhere teach or suggest providing a flag for each data set in the first and second storage devices having the same data sets, where the flag for each data set indicates whether a previous access to the data set failed. Instead, the cited col. 2 just mentions how identical data can be copied to different units in a storage device.

In the Office Action, the Examiner did not respond to the above arguments with respect to claims 4, 13, and 22, nor explain where the cited Tanaka teaches or suggests the claim requirement of providing a flag for each data set in the first and second storage devices having the same data sets, where the flag for each data set indicates whether a previous access to the data set failed.

Moreover, the Examiner has not cited any art that teaches or suggests that a data level as well as flag are maintained for each data set in the first and second storage devices. As discussed, the Examiner has not cited any art teaching or suggesting a data level for each copy of a data set on different storage devices indicating a number of times the data set has been updated.

Page 15 of 19

Accordingly, claims 4, 13, and 22 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 5, 14, and 23 depend from claims 1, 10, and 19 and further require: accessing the data set from one of a third and fourth storage devices if the data set is in one of the third and fourth storage devices, wherein the steps of selecting one of the first and second storage devices and accessing the data from one of the first and second storage devices occurs if the data set is not in one of the third and fourth storage devices; copying the data set from the first storage device to the third storage device when accessing the data set from the first storage device; and copying the data set from the second storage device to the fourth storage device when accessing the data set from the first storage device.

The Examiner cited col. 13, lines 51-56 as teaching the above claim requirements. (Office Action, pgs. 5-6) Applicants traverse.

The cited col. 13 mentions that if there is a failure, data can be recovered from any of the disk drives having the multiple copies of the data and that recovery data can be written to write enabled disk drives without writing of the data in specific drives.

Although the cited Tanaka discusses writing identical data to different disk drives, nowhere does the cited Tanaka anywhere teach or suggest the claim requirement that a data set is copied from a first to third storage devices or from a second to fourth storage devices when the data is accessed from the first or second storage devices.

Accordingly, claims 5, 14, and 23 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

In the response to arguments, the Examiner cited col. 9, lines 37-49 as teaching the claim requirement of recalling the data set from the third storage device if the scheduled write operation has not yet copied the requested data set to the first storage device, wherein the steps of selecting one of the first and second storage devices to access the data set and accessing the data

Page 16 of 19

set occurs if the scheduled write operation of the data set to the first storage device completed. (Office Action, pg. 8) Applicants traverse.

The cited col. 9 mentions that when the number of disk drives cannot satisfy the multiplicity or number of drives required, disk drives having free areas are selected for the data. Nowhere does the cited col. 9 anywhere teach or suggest the claim requirement of recalling a data set from a third storage device if a scheduled write from the third to first storage device has not yet copied data, and that selecting one of the first and second storage devices to access the data set occurs if the scheduled write has completed. Instead, the cited col. 9 discusses how to disk drives having free areas are selected.

Accordingly, claims 6, 15, and 24 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 7, 16, and 25 depend from claims 6, 15, and 24 and further require randomly selecting one of the first and second storage devices from which to recall the data set if the requested data set has been copied to the first and second storage devices as a result of the scheduled write operation and if the flags for both storage devices have the same value.

The Examiner cited col. 13, lines 48-56 of Tanaka as teaching the additional requirements of these claims. (Office Action, pg. 6)  Applicants traverse.

As discussed, the cited col. 13 mentions that data to be recovered at time of recovery of a failure in any disk drive is obtained from identical data multiply copied in some disk drives so that the recovery can be written at any time.

Nowhere does this cited col. 13 anywhere teach or remotely suggest that one of the first and second storage devices is randomly selected for the recall if the requested data set has been copied to the first and second storage devices and if the flags (indicating whether a previous access failed) have the same value. Nowhere does the cited col. 13 anywhere suggest this sequence of operations and determinations, i.e., randomly select if requested data copied and if flags have the same value.

Accordingly, claims 7, 16, and 25 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 8, 17, and 26 depend from claims 5, 14, and 23 and further require further comprising determining whether the data set is in both the third and fourth storage devices, wherein accessing the data set from one of the third and fourth storage devices comprises accessing the data set from one of the third and fourth storage devices having the highest data level for the data set. The Examiner cited col. 13, lines 59-62 as teaching the additional requirements of these claims. (Office Action, pg. 8) Applicants traverse.

The cited col. 13 of Tanaka mentions that the addresses of data, the multiplicity of data and the history of data can be updated so as to be converted inside the apparatus by a simple user operation.

Nowhere does this cited col. 13 anywhere teach or suggest the claim requirement accessing the data set from one of the third and fourth storage devices having the highest data level for the data set. Instead, the cited col. 13 just mentions updating multiple instances of data, i.e., multiplicity of data.

Accordingly, claims 8, 17, and 26 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 9, 18, and 26 depend from claims 8, 17, and 26 and further require randomly selecting one of the third and fourth storage devices from which to access the data set if the data levels of the data set at both the third and fourth storage devices have the same value. The Examiner cited col. 9, lines 47-48 as Tanaka teaching the additional requirements of these claims. (Office Action, pg. 6). Applicants traverse.

The cited col. 9 mentions that when the number of selected disk drives cannot satisfy the multiplicity, supplements are selected.

Nowhere does this cited col. 9 anywhere teach, suggest or mention the claim requirement of randomly selecting one of the third and fourth storage devices from which to access the data

set if the data levels of the data set at both the third and fourth storage devices have the same value.

Accordingly, claims 9, 18, and 26 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

### Conclusion

For all the above reasons, Applicant submits that the pending claims 1-27 are patentable over the art of record. Applicants submit that no additional fee is needed. Nonetheless, should any additional fees be required, please charge Deposit Account No. 09-0466..

The attorney of record invites the Examiner to contact him at (310) 553-7977 if the Examiner believes such contact would advance the prosecution of the case.

Dated: July 7, 2004                              By:_____

                                                 David W. Victor
                                                 Reg. No.: 39,867

Please direct all correspondences to:

David Victor
Konrad Raynes & Victor, LLP
315 South Beverly Drive, Ste. 210
Beverly Hills, CA 90212
Tel: 310-553-7977
Fax: 310-556-7984

Page 19 of 19